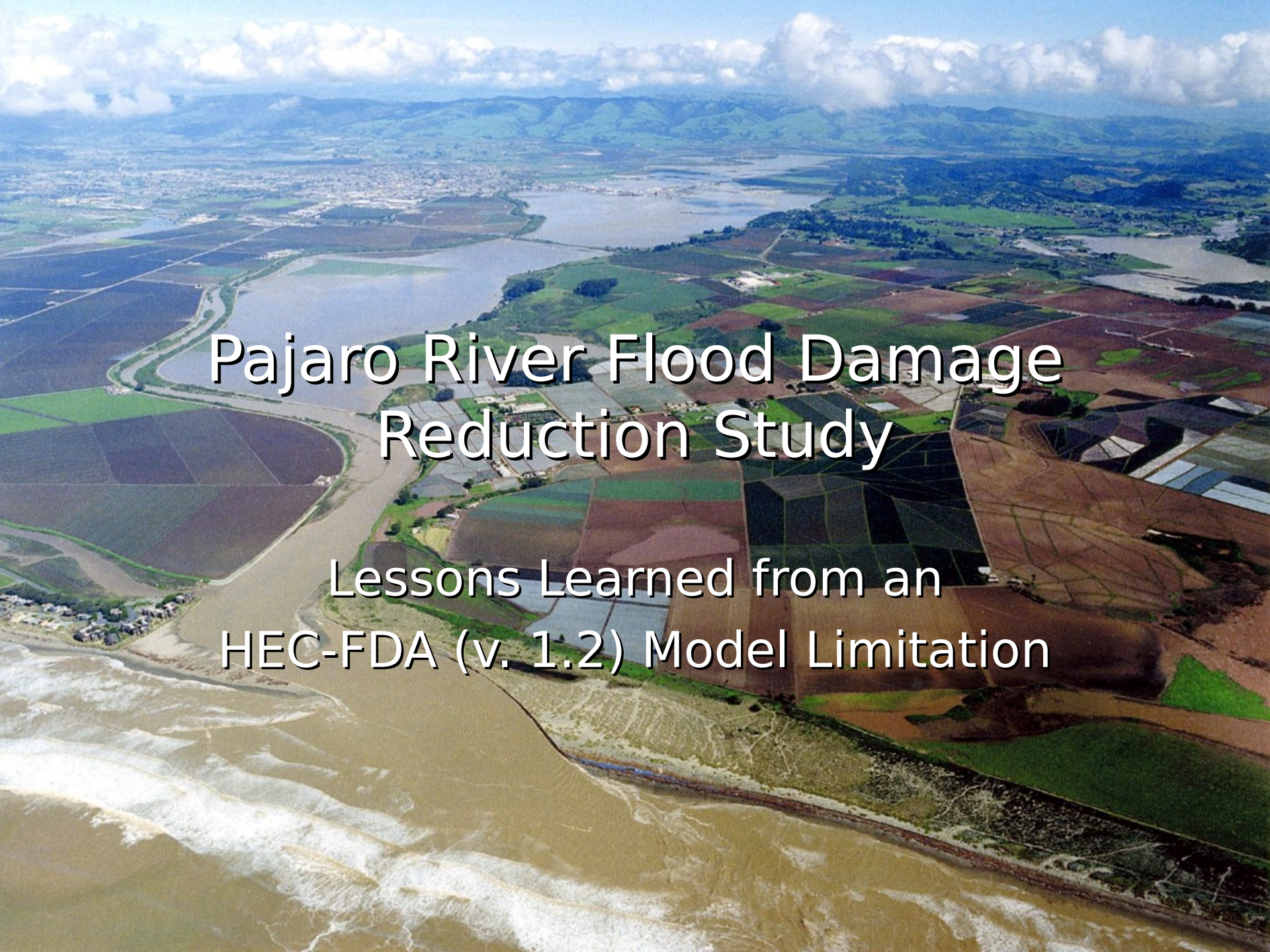


Pajaro River Flood Damage Reduction Study

Lessons Learned from an HEC-FDA (v. 1.2) Model Limitation

Objectives

- Inform HEC-FDA users of model limitation
- Prevent someone from making the same mistake
- Describe the “work around” to the limitation

(Presentation assumes working knowledge of program)

Overview

- General Description of Pajaro Study
- Original Economic Analysis
- HEC-FDA Model Limitation
- Effects of Limitation (Graphical Explanation)
- Revised Economic Analysis
- Lessons Learned

General Description of Study

- General Reevaluation Study (GRR)
- Study area located 75 miles south of city of San Francisco
- Area prone to flooding from several sources: Pajaro River, Corralitos Creek and Salsipuedes Creek
- Existing levees (built in 1949) provide protection from about a 10- to 20-year event
- Types of damages: Urban and Agricultural
- Last flooding events: 1995, 1997 and 1998

Original Economic Analysis

- Computed stage- aggregated damage curves in HEC-FDA
- Computed expected annual damages (EAD) in HEC-FDA using computed stage-damage curves, exceedance-probability functions, stage-discharge functions, *geo-technical failure curves and exterior-interior relationships*

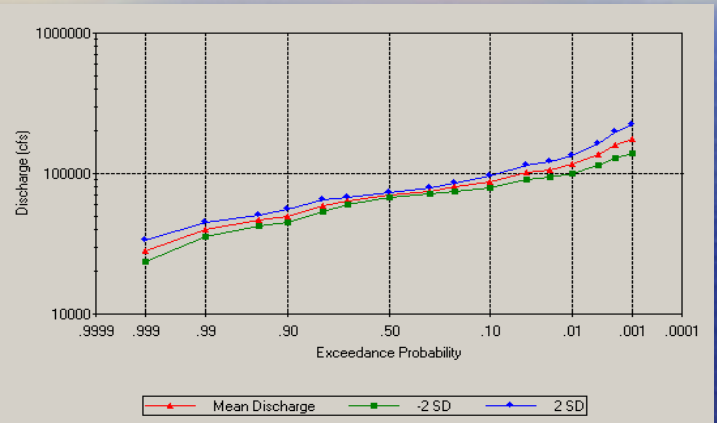
HEC-FDA Model Limitation

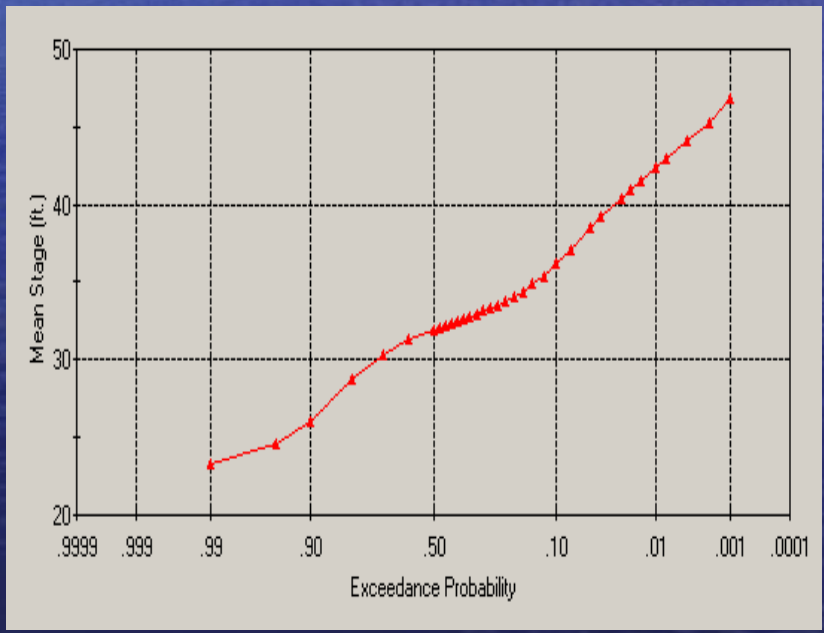
- Cannot use exterior-interior relationship and geo-technical failure curve at the same time (version 1.2)
- Program ignores exterior-interior relationship when both it *and* geo-tech levee failure curve entered

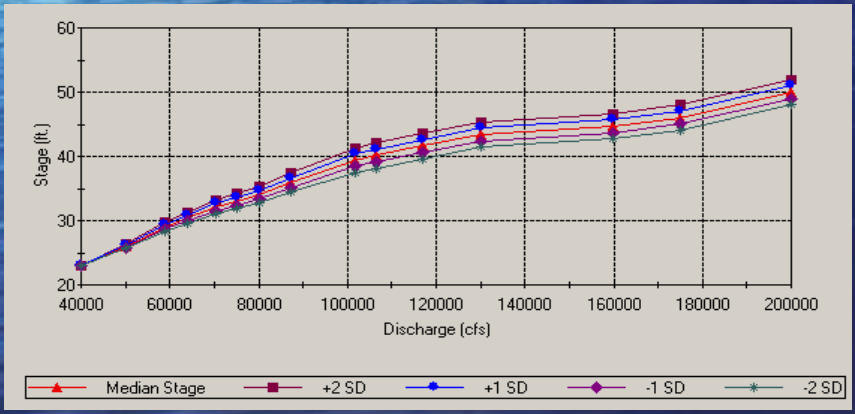
So What Does This Mean?

- Interior flood plain stages overstated (i.e., probability-stage curve should be shifted downward)
- Probability-Damage curve overstated (i.e., it should be shifted downward)
- EAD overstated (smaller area under the curve)

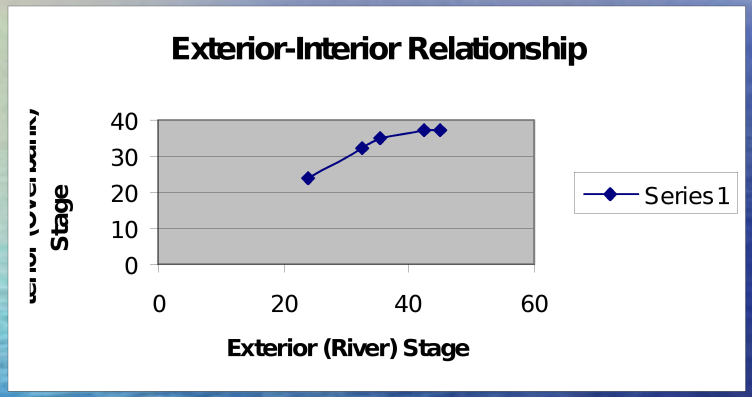
Probability-Discharge + Stage Discharge = Probability-Stage



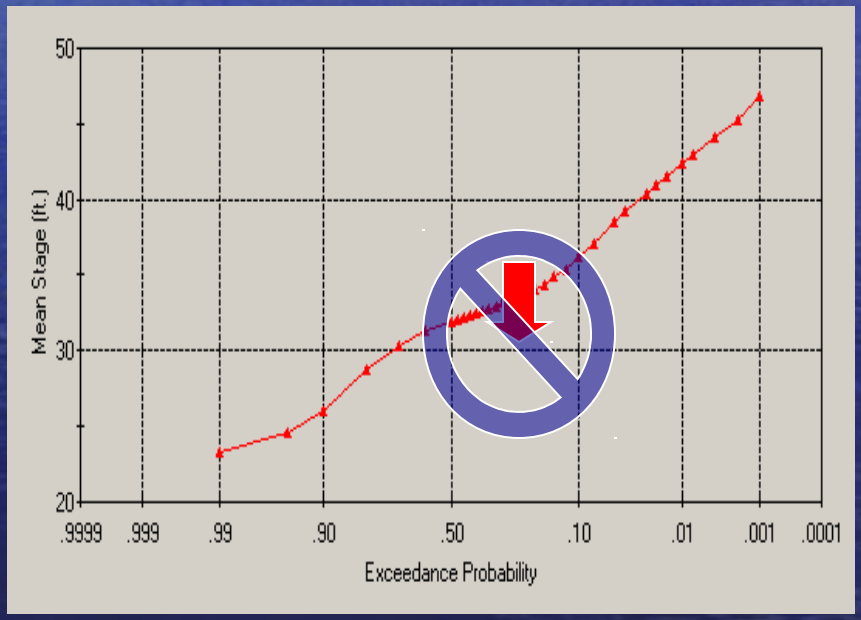




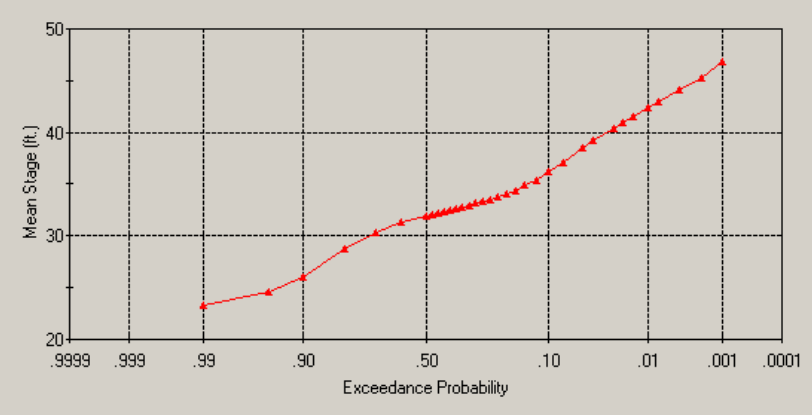
Probability-Stage and Exterior-Interior Relationship

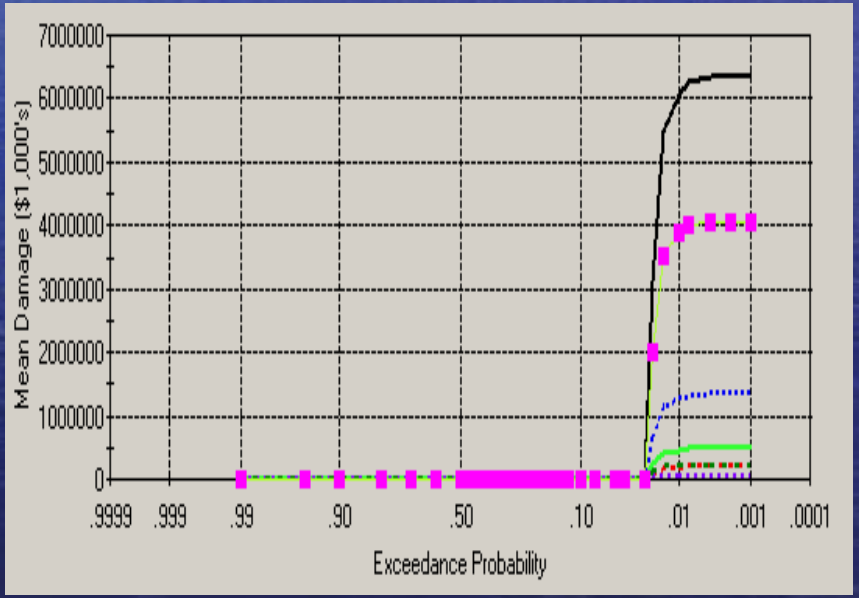


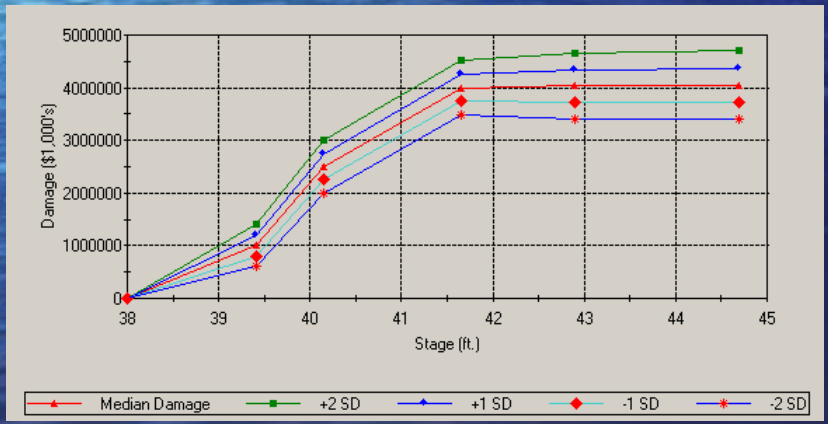
Exterior Stage	Interior Stage
24	24
32.5	32.5
35.5	35
42.5	37
45	37.5



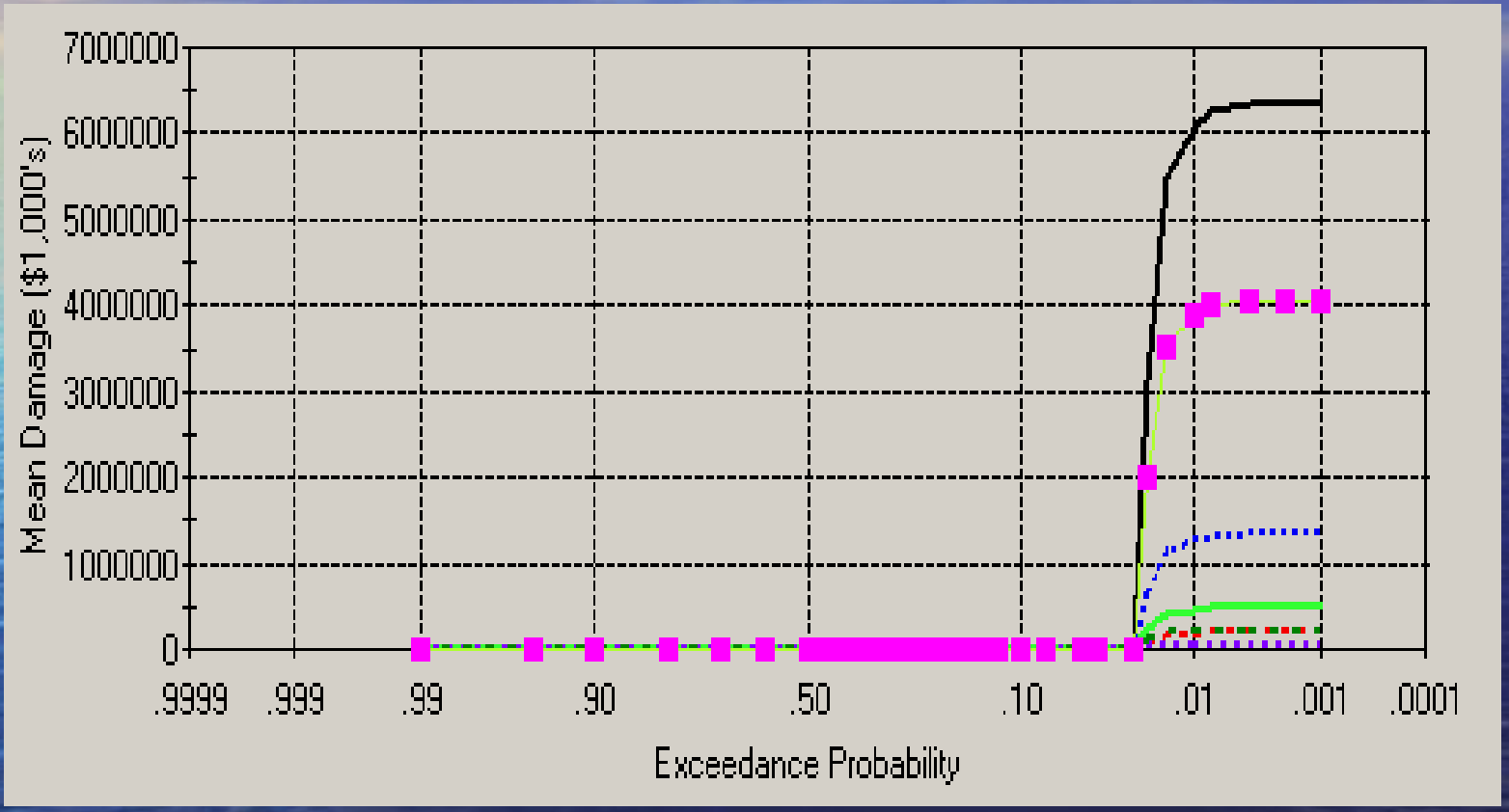
Probability-Stage + Stage-Damage = Probability-Damage







Probability-Damage Curve ➔ Integrate to compute EAD



Revised Economic Analysis

- Computed Stage-Damage curves outside of HEC-FDA using GIS applications and @Risk software
- Computed EAD in HEC-FDA using three main functions and geo-technical levee failure curve; exterior-interior relationship NOT necessary

@Risk Software

- Excel Add-On
- Incorporates economic uncertainties
- Develops frequency-damage curve

Lessons Learned

- **Do not use exterior-interior relationships and geo-technical levee failure curves at the same time (HEC-FDA v1.2)**
- Understand how the software program works
- Check results closely!

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Questions?